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ABSTRACT

Technology, applied to education, is most effective when it is fused into the educational system. This paper proposes techniques which will be most responsive to the social and political exigencies that affect education. Technology may, in itself, be used to educate the decision-making segments of our society in the optimum method of employment so as to adjust our societal needs to these characteristics. (GO)

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Technological Systems for Education
Which Adapt Technology to People

by Alexander Schure*

This paper envisions technology applied to education as being most effective when attuned to accountability of the various arrangements of the educational system. It hypothesizes techniques which can identify and recommend the most effective implementations of techniques most responsive to the social and political exigencies that affect education. It suggests that occupational education can only be advanced substantially when the foundational base is made culturally responsive for minority groups and suggests additional support systems structured through technology to achieve a more responsive educational system. It also delineates an individualized system monitored by a computer to make present educational occupational programs more relevant in the higher education area. The paper concludes with the suggestion that technology may, in itself, be used to educate the decision-making segments of our society in the optimum method of employment of personnel so as to adjust our societal needs to these characteristics.

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Technology applied to education must be broad based and go well beyond conventional interpretations of existing systems. Present day instructional technology must add to its hardware-software combinations exemplified by audio-visual, multi-media, computer-based, television, communications equipment and other resources. A new technology must emerge to include those total management and informational systems capable of relating the wide range of the social processes which encompass education. Within this technology, composites of machines, strategies and techniques may be abstracted for each individual human so as to yield the most effective combination pertinent to a given person and environment. All informational, managerial, predictive and decision yielding systems in themselves must become part of the technology.

This broader definition enables a new flexibility, adapting technology to people rather than forcing adaption of people to technology. It brings man a step closer to the zero reject concept in education. Realization of this philosophy would give to each person, at any time, an opportunity to reach his largest probable educational success level. Further, through an appropriate information and retrieval system there can be detected impediments to progress early enough to permit corrective action.

Technology with its predictive capability can provide guidance for additional assists or alternate paths. There would then be no failures - no rejects for any individual in a heterogeneous population - in fact for any useful member of an entire society.

One basis of success for technology, when properly applied to occupational and technical education, exists in its capacity to match (and coordinate) community needs to the regional resources required to alleviate these needs. As pedagogues, we tend to think the problems of developing and releasing talent can be solved by the school. Actually, the solution is essentially political and social. A free and open society which attempts to recognize the marvelous uniqueness and value of every individual must also have the wisdom to realize the school can do justice to its total constituencies only when its educational framework is truly integrated into other social formats. When we examine the persistent problems which impede the education of a wide spectrum of our children and youth, and relate the efforts of our school system to cope with them, it seems appropriate to indicate concepts of the educational framework in which better "solutions" than those now available may take place.

Education must prepare for a consistent performance in some socially valuable activity. This includes serving not only the intellectually gifted or the academically talented but those who must function capably in a range of procaic occupations, in the graphic and performing arts, in the technical crafts, and in social leadership.

An educational format capable of satisfying the interacting logistical and economic demands of such an organized system are, or will be prime among the objectives of education.

If technology is to be used effectively, it must be attuned to

the challenging and pressing problem of education for the culturally different. Success in contributing to a resolution of the myriad of problems within the social cultural context - how to deal adequately with students drawn from the urban slums or rural poverty areas; how to deal with minority groups; how to cope with the dropout; and how to harness increasing militancy of both students, teacher and local communities as they struggle for values important to them - will have the most profound effects upon the viability of the educational system.

It seems likely that much of our national energies in the future will, of sheer necessity, remain focused on the more persistent and recurring areas of concern that now make many of our public schools a battleground for varied and conflicting interests. There are no easy and quick solutions.

Present efforts are piecemeal and ineffective. Yet, unless an emergency status which recognizes the crises which now exist is perceived, it becomes questionable that there will take place that extent of reorganization of existing agencies, expenditures of Federal and State funds, and the development of necessary new patterns required to deal with present problems of the urban areas, their inner cores, and the people who constitute them.

Required are broad based focused programs which are feasible economically and operationally; are directed towards both majority and minority groups; point to long term and short term objectives, beginning with pre-schools and continuing into the adult years; and

aim at stabilizing the inner city by providing means through which the requirements and desires of minority factions can in actuality be met. The needs of these constituencies go beyond welfare and employment. They include as a high priority the maintenance of dignity for the individual; his ability to exercise control over decisions that relate to his own life; and the means whereby he may develop his resources in directions that yield promise of substantial future returns to him. Solutions will be found in programs acknowledging the interactional relationship between majority and minority, directed towards the value and belief systems of whites as well as non-whites and other minorities. Technology, aptly and adequately applied, can provide the necessary tools.

The present educational systems are not without their strengths. They are least effective in responding to the needs of inner-city and minority cultures. If primary education with these groups is ineffective, whatever follows is remedial and patchwork. Hence, restructure of education at the earliest levels to be "culture responsive" is a necessity if there is to be subsequent success within the worlds of work and education.

To make a quantum leap forward in occupational education, education for the minority groups must be improved substantially. Involved in culture responsive systems are all the urgent problems common to, and complicating, urban, minority and migrant education. Pertinent factors include increases in the population, over centralized control, non-white populations, little cross-class interaction,

violence arising from extremist forces and the loss of tax base to the communities. Complicating the problems in minority education are the debilitating effects of insufficient primary and secondary education; the lack of motivation resulting from home problems; the lack of relevance to minority values; the shortage of competent counseling; and, the lack of financial support for professional education for the minority groups.

There is a futility to any single, uni-factorial direction. If there are solutions, they will be found in multi-factorial approaches. Current trends include the development of resources within particular regions and communities into new forms of urban educational institutions (one element within this structure is concerned with the training of leaders drawn from the inner city who will return to function within the inner city core); requiring all of the institutional segments concerned with occupational education to have closer relationships with industry; and, the stipulations that all elements projected for an emerging multi-factorial system must maintain a sufficiently well organized research base to permit replication within chosen areas for those aspects of the model which are successful.

There are educational support systems which can be structured through the capacities of technology so as to achieve a more responsive educational system. One such system could well be a "redundant school system". The "redundant school system" term is used in the engineering sense, as an alternate or replacement when the primary

system fails. Envisioned is a backup school system from pre-K - 16, public or private, which has continuous, individualized education for maximum development of each student according to his abilities and vocational aspirations. Students can range from youngsters to grown adults.

The structure of education within the redundant system would be based on the most applicable technological techniques. These would certainly include administration of programming and referral through systems analysis. Special instructional materials would be utilized with grades or certification based upon units of behavioral increment. Progress in education would be gauged in terms of measurable output and made certifiable by achievement criteria. Quantitative measures of such improvement would be evolved and the systems structured to provide for educational patterns that assist in achievement of desirable goals, be they social or political.

Within formal schools, in community centers and industry, there would be access to the "back-up" or redundant school system. Attendance for remedial help could be encouraged. The facilities for, or access to, advanced work and vocational training would be provided as an alternate to the available back-up system within the formal school program. The ability to grant high school and advanced degrees through the back-up educational system, individualized programming, subject matter structured on continuums, with each step being known as a unit of behavioral increment, the enhancement of motivation through monetary rewards to families or to local community

groups for a rise in level of performance to or beyond the normatively expected unit of behavioral increment and the involvement of community trained personnel could all be well within the purview of the back-up system.

The educational advantages of an individualized system include diversity, flexibility of feeder patterns, equalization of educational opportunities, academic multi-level opportunities and programming patterns which are innovating, flexible, and open. The learner then can be brought to understand the relevance of learning through its integration with the world of work, and of life itself. In a cooperative work study milieu, payment for an appropriate unit of behavioral increment could yield appropriate motivations. The student's progress then becomes self-actualizing, dignified, and self-conceived. Individualized instruction provides a new climate where education has prestige and status for the student who is a non-performer in today's world.

The system must also be capable of beginning fundamental learning processes at an early age so that receptivity to educational stimuli can promote educational success at later times. The individualized instruction within such a system necessitates referrals between agencies within a given region, interaction between schools, community centers, industry, government training agencies and schools outside the back-up system. Such interaction must take place between project agencies, governmental, and the social agencies outside projects.

Within the system there must also be initiation of technical and paratechnical job training at any time for those who desire it so as to insure employment for the newly trained as well as the unskilled. The system must likewise initiate or provide access to a wide range of social services including social welfare and psychiatric services. Likewise, access to employment agencies is imperative. Again, modern technology can be utilized to insure immediate knowledge of available offerings to prospective employees for vocational counseling or job placement. Carefully formulated educational plans for our schools of the future must provide for diverse heterogeneous student inputs, with methodologies capable of matching the inventory and the potential of each individual they will service to his subsequent career environment. Such plans must also provide the means for transformations towards an interest goal, with a high probability of attainment. They must furnish the resources to develop human talent in an optimal way. Programs with these dimensions must be self-improving, therefore flexible.

Flexibility is the predominant trend, and attention to the individual the keynote of future efforts. Almost all the state plans now endorse this theme, and their goals for occupational education reiterate these ideas often as the means of achieving the central aim. Thus we find these points recurring in various state education department statements:

1. The structuring of an overall fundamental master plan that, once developed in consultation with

all appropriate agencies, provides for the orderly development of occupational education in the region to be serviced.

2. The utilization of a variety of agencies and institutions tailored to provide programs and services to correct those educational deficiencies in people of different age groups, abilities, and educational status which could prevent such trainees from benefiting from instruction designed to lead to their employment.
3. A broadening of occupational educational programs to meet present and predictable employment and pre-employment needs and skills.
4. Together with continuing vocational guidance and counseling at all levels, services are envisioned utilizing shared-service boards, the facilities of area schools, high schools, and public and private community colleges and technical institutes. Further, expansion of occupationally-related programs throughout the education system from elementary through post-secondary levels are ultimately foreseen.
5. The speeding up of the development of larger shared-service units to increase occupational education efficiencies.

6. The designing of special arrangements, including work-study or apprenticeship programs, where appropriate, or where special educational needs exist.

The concern for developing the maximum potentialities of each individual in the society has brought renewed interest in the development and structuring of new curriculum patterns, along with efforts directed at the improvement of existing courses of study. Add to these directions the availability of an information processing, retrieval, and communication technology ever increasing in sophistication, the broadening diverse role of the media in attaining instructional objectives, and the development of systems engineering and management techniques applicable to fundamental educational problems. All permit greater attention to the individual. Accomplishing such individualization is the task of properly utilized technology.

The need for successful individualized instruction runs like a common thread through the multiplicity and diversity of educational problems that challenge the American educator today. All the themes touched on--the "knowledge explosion", the problems of teacher training, the need for equality of educational opportunity, the population growth, the insufficiency of trained manpower for technological advance, the increase in our awareness of student differences in learning ability - all these stress the need for American education to develop a system of pedagogy that can identify and maximize individual student achievement regardless of level or

category of learning ability. And with the recent incidence of failures of school budgets across the country, there is also the suggestion of a nation-wide push for a more satisfactory investment - in terms of student attainment - of local tax dollars for schools.

The issue, of course, is more than one of mere facilities, curriculum or teacher proficiency. There is, and this is most important, the necessity of identifying a student's ability level, isolating what he can learn from what he needs to learn, and teaching him, on the basis of valid identification procedures, what he needs to know before he can proceed to more advanced levels of training. It becomes other than a question of teaching him to learn more in terms of speed and quantity; there is the need as well to determine what he needs to be fed if the student is to be expected to thrive on a properly balanced and nourishing educational diet.

What has become essential to provide is a self-improving educational system in which each student in a large heterogeneous population may receive the individualized instruction which would permit him to proceed along an educational path which, as far as he is concerned, is optimal. He also needs a system which would allow him to proceed towards these defined objectives with a high probability of attainment. The decision makers also require data that will permit them to manage the system with confidence.

No pedagogical or educational management process system has yet emerged as a validated total system that actually brings to fruition

much more substantially than has heretofore been the case the possibilities for learning in this generation of students. One aspect of the problem is found in the inability to train or diagnose in or out of the classroom the various potential or specific causes for failure or under-achievement. The necessity of finding such a system - self-improving, individualizing, diagnostic and prescriptive - becomes more and more urgent.

Simultaneously, the invention of the computer has offered to education enormous possibilities for advancement. It has already been used for the automation of corollary information and data processing systems, but has only just begun to be explored for use in the educational process itself. The computer, in fact, offers tremendous possibilities for the management of the educational process, freeing the teacher from more routine tasks for more intensive kinds of consultation with students and individualizing instruction to a degree never before considered possible.

A substantial number of researchers have been investigating just such possibilities relating to the individualization of education for larger numbers of diversified students through a computer-based management system. This system does, via technology, what only very large numbers of staff and dollars could hope to do:

1. it discovers what the student should do to get an education;
2. it keeps track, by means of the computer's "memory" of the student's history and progress;
3. it assesses whether or not the student is being

satisfactorily taught (i.e., whether or not his less than total success or failure is due to some weak quality in the course itself);

4. it provides the student and the teacher with validated information to enrich the rapidly-learning student or to intercede with appropriate correction for the slower-learning one.

The objectives of relevant ongoing programs aim to develop and refine an operant self-improving system which can provide individualized instruction to a heterogeneous population; to employ computer facilities and student guidance techniques for the purpose of helping a learner proceed along an effective path which is directed towards well defined objectives; to utilize computer capability to provide both the student as well as those responsible for his education rapid feedback concerning his academic progress and problems; to extend the material resources and media available to the learner which are relevant to his needs and appropriate to his level of attainment; to institute techniques for systematically evaluating the program so that it becomes inherently self-improving, and to achieve a viable articulation between elementary, vocational, high school, and lower college levels which offer a continuum for a diverse student population.

Although early systems for the computer-mediated management of the educational process are being tested, for practical purposes, in a specific curriculum context, the essential objectives of most of the research remain the development, refinement and evaluation of the

system itself; the specific validated curricula that will emerge as well should be viewed as secondary to the main objective.

Essentially, such control will allow the administrator to devise and refine an educational system that eases the rigidity of the predetermined instructional pace, loosens the ties of lock-step instruction, yields information relating to the success of instructional strategies and allows students to learn at a pace commensurate with their ability to grasp the contents of a course at any given time.

The two principal necessary phases are:

1. The "ordering" of the management system, and
2. The measurement of the efficiency of that "order" via the management system.

It is these elements that are now in development. In summary, the computer will be used by the schools:

1. for simulation of the interactions within comprehensive districts and/or the units which compose them;
2. for cost-effectiveness evaluation;
3. to serve as a diagnostic tool to facilitate the rapid evaluation of individual as well as group student performance;
4. for prescription of optimum mixtures of people, strategies, resources, media and materials appropriate to the different levels and degrees of learning that occur at any given time, thus individualizing the instructional program;

5. to institute much more rapidly, as a result of the computer-based profile-sensing, the most effective remediation measures (programmed instruction, audio-visual tapes, tutoring, supplementary reading assignments, special laboratory or class experiences, emphasizing the specific area of deficiency) thus avoiding the accumulation of confusion that often accompanies subsequent units of instruction;
6. for teacher and pupil guidance as appropriate;
7. to evolve networks, as easily used by lay personnel as by computer oriented specialists, which can store, process, analyze and communicate relevant information to be used in all phases of educational endeavors.

Although management techniques and the approach of the systems analyst have become considerably more common in attempting to cope with the problems of the schools of today, there is still a long way to go before effective implemented systems are the rule rather than the exception. Adequate computer mediation schemes which form part of instructional management systems can make possible not only flexibility and individualization, but accountability of the elements within a system as well.

To test the concepts described previously, several models are being developed. One, Project ULTRA (at New York Institute of Technology) can serve as the type of prototype this author has in mind.

The following is a description of Project ULTRA, which is unique in several aspects. First, through a technologically-based system, education for large numbers of students is virtually individualized; special learning requirements, such as those of the disadvantaged student, can be successfully fulfilled here as a result. Secondly, ULTRA is not a purely academic concept. Its organization entails thorough cooperation with business and industry, as well as government.

Project ULTRA is based upon the utilization of a systems approach to education, the computer mediated analysis of the multi-faceted and sometimes problematic educational sphere. Such analysis should yield an orderly, integrated solution to occupational education capable of accommodating special situations, meshing individual requirements with societal demands. It is hoped that Project ULTRA will prove to be one cornerstone on which to rest continuous escalation through continuing educational cycles.

One of ULTRA's primary objectives is the construction of an organizational framework whereby every individual possesses a maximized opportunity of realizing the predicted match of his potential and occupational or school inventory with a high probability of success. No individual who desires to improve his education towards a career objective is rejected from ULTRA; however, an individual may be channeled towards a lesser occupational objective if his present abilities indicate a low probability of success for his initial choice. Alternate Skills Programs (ASP), Auxiliary Training Programs (ATP), College Preparatory Program (CPP),

Institutional Off-Campus Programs (IOFF), Deficiency Correcting Phase-In Programs (PI), Industry-College Cooperative Associations Programs (CB), Differentially Paced, Self-Organizing Computer-Based Experimental Programs (X), and others are related to ULTRA's mainstream program through a computer-managed Information Center (IC). The Center constitutes that facet of ULTRA's central system which perpetually gathers data from all sources. It stores, analyzes, retrieves, and distributes information to appropriate locations (e.g., the Admissions Center (AC), the Diagnostic Examinations Center (DEC), etc.) where convergence of informational and decision-making processes fosters responses to activity areas and programs. The integrated operations of Project ULTRA necessitate the computer-oriented Information Center to handle the volume and processing of important data. Informational feedback from advanced stages of the program provide the source of improvement for the predictive functions of the Information Center, thus guaranteeing automatic self-correction. The flow chart (Figure I) is a schematic outline of the overall concept of ULTRA.

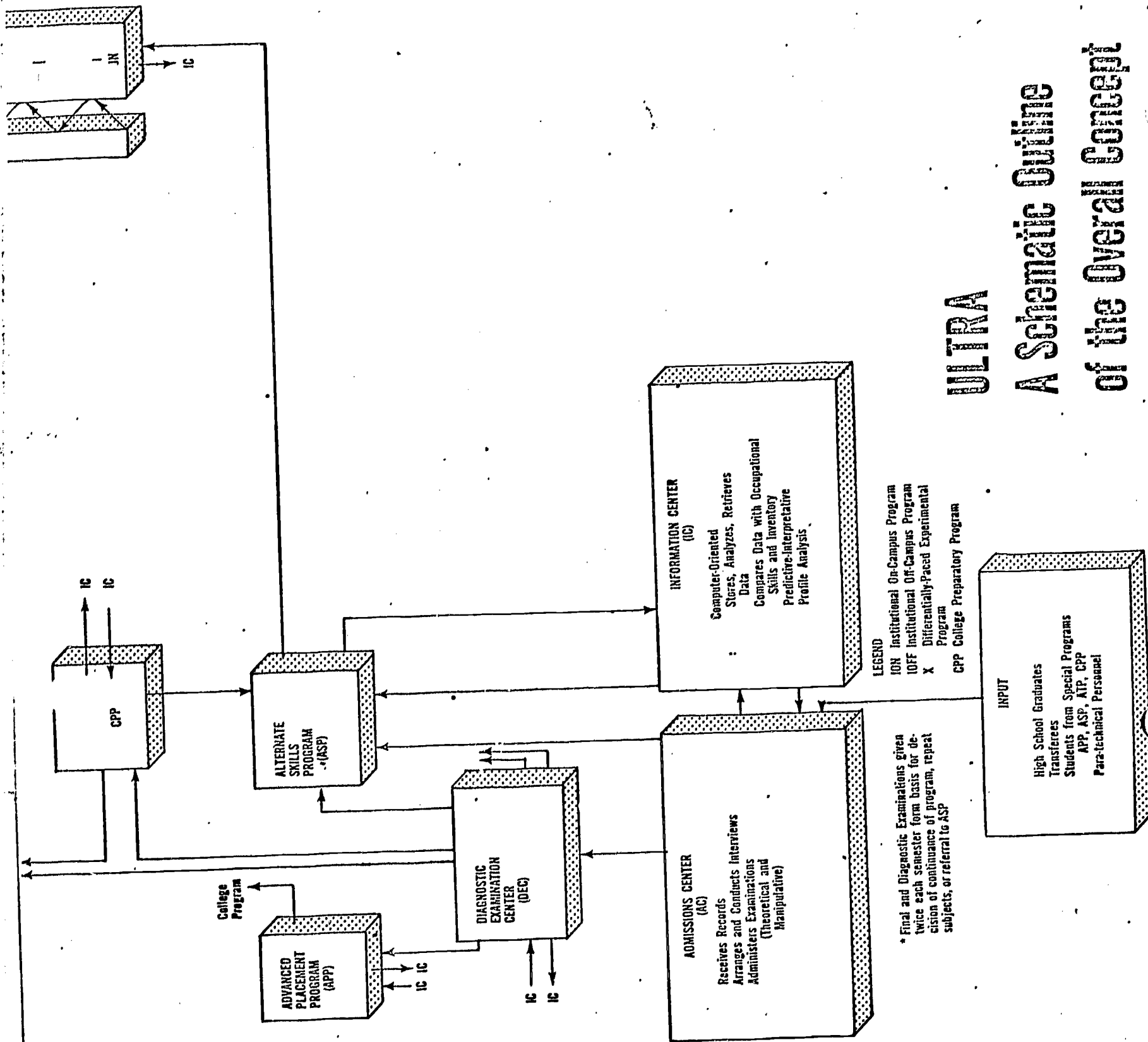
An additional purpose of Project ULTRA is to provide the opportunity for each student to achieve the educational success essential to his pursuance of a selected career objective. That objective is selected via a student's interests and abilities, which are diagnosed, discussed, predicted and interpreted by the combined skills of man-made examinations, computer-oriented methodologies, and man-machine interpretations. Of course, the human has final decision-making approval. In order to establish the qualifications for his chosen career, it is

OCCUPATIONAL INVENTORY (SI--IN)



Figure 1

ULTRA A Schematic Outline of the Overall Concept



imperative that such requisites be precisely defined as part of ULTRA's initial process.

The system invites high school graduates. These may be of recent origin, or have been in the occupational world for some length of time. The design also accepts as transferees, others who previously could not meet admissions standards for a college program, but who, on the basis of new training or experience, may have risen to acceptable standards. The Admissions Center receives student records and conducts interviews as an integral part of a pre-counseling service. College aptitude, plus manipulative and technical skills are tested through examinations administered by the Admissions Center.

The resulting data are fed into the Information Center, which compares them with the Occupational and Schools Inventory and issues a success probability prediction, which in turn is forwarded to the Admissions Center. This preliminary information also constitutes the initial basis of the applicant's profile. After the AC receives the comparative and analytic information from the IC, the next possible alternative is plotted.

If the success probability for the applicant in a specific college-level program is low, a match is made with an Occupational Classification (J..) of related interest and a high attainment probability. The student is referred to the Alternate Skills Program for training in related, career-oriented skills (J..).

The outcome of this training is not limited merely to the area of anticipated competence; the student can participate in the Auxiliary Training Program (ATP) which permits re-entry into the

college admissions center upon certification of acceptable performance. Thus, the possibility of further educational advancement is always present.

Students who evidence college potential in the Admissions Center are processed through the Diagnostic Examinations Center, (DEC). In the DEC, achievement examinations are administered in reading, English and associated skills, and math and specialized subjects. Examination results are fed to the IC, where informational and predictive processes continue and predictive analytical results are returned to the DEC. At this time, one of the following decisions is made:

1. The applicant is ready for college education (with or without intensive deficiency phase-in programs in English and mathematics (EPI or MPI), or preparatory programs).
2. The applicant, not prepared for college education, is referred to the Alternate Skills Program (ASP).
3. The applicant already possesses college education or its equivalent, thereby qualifying him for Advanced Placement Examinations and subsequent phase-in to the College at an advanced level.

Those students found by the Diagnostic Examinations Center to be deficient in reading comprehension or any two specialized areas (e.g. English and math) but who nevertheless appear to have the aptitude and ability to attain rewards from college education will be directed to a College Preparatory Program (CPP). Here, intensive training in basic subject areas will be provided in order to raise the student to college-level performance. In keeping with the Ultra philosophy, examination results will be fed into the Information

Center, from which a returned analysis to the Diagnostic Examinations Center will in turn encourage one of the following recommendations:

1. Acceptance in the College Program
2. Direction to the Alternate Skills Program (ASP).

The Institutional On-Campus Program (ION) is the mainstream process which most closely resembles the traditional four-year baccalaureate programs. On-campus program (ION CB) is a work-study plan available to paratechnical personnel who may utilize this opportunity for continuing their college education.

Students diagnosed as weak in a particular subject area may pursue the normal course load, but in place of the conventional class, the student will enter an intensive training course in the area of his deficiency. Specialized instructional methods will be utilized here. Upon the successful completion of diagnostic examinations geared to the normal, functional course-work level, the student will be phased into a regular class.

Modern educational technology has facilitated the creation of off-campus degree-granting programs with emphasis on technical, industrial, distributive, business, and paratechnical areas. Academic excellence and social value can become an inherent part of this new design through the use of authoritarian agencies (such as the New York State Education Department and the Educational Testing Service Advanced Placement Programs). Students emanating from industry and chosen for advancement in the industrial framework can now earn either a degree or other appropriate certification.

The gain serves as a protection against obsolescence and an inculcator of meaningful social status. Both are, of course, highly desired and urgently required. The generation of industrially related institutions is one of the primary objectives of IOFF.

One correlate of Project Ultra has been the development of a self-organizing, computer-based educational system (X). In it, a computer makes diagnostic evaluations of the student's prior achievement, gives him required learning materials, gauges his progress and helps him to complete specified objectives. The computer then aids in the assessment of acquired knowledge as a measure of the student's ability to perform academically, and as a basis for beginning further instruction. The computer-designed profile of the student is based upon his knowledge, plus his abilities and personality characteristics.

This individual diagnosis allows a student to enter any learning situation at the point where he is most likely to perform optimally. Having discovered the precise limits of a student's knowledge in all subject matter areas, the computer selects his appropriate learning resources - the lectures he should attend, the texts for him to study, the films to see. These assessments, too, are geared to a student's interests and personality as well as his academic competence.

In this self-organizing method, the computer devises a mechanism for checking the learner's progress against a specific objective, whether it be the accumulation of course credits towards a degree, or the satisfaction of a need for continuing education, the modernization of professional backgrounds, or the mastery of technical skills.

The student may leave the system without restriction of artificial time limitations, when his objectives have been satisfied.

Project Ultra is founded on the assumption that technology is the key through which the door to a model educational system, generalizable on a mass basis, can be opened. Ultra's prime objective is to extend the availability of college education to students, who under conventional educational systems, would find that goal unattainable; individualization of instruction insures their success.

The prognosis for movement towards full employment sources is good. There is still much new work to be done within the structure of our society to eliminate poverty, to revitalize and rebuild our urban centers, to strengthen our transportation systems, and to upgrade our health, medical and educational services. We can expect, over the long term, additional employment to be made available as the result of shorter work weeks, earlier retirements, later entry into the labor force and even the equivalent of sabbatical or educational leaves for members of the labor force.

These directions, however, will not come to pass in the immediately foreseeable future, and other methods must be found to achieve full employment. It may be necessary with all of the ramifications for education, both formal and informal and with the necessity of a much greater part of the total lifetime being devoted to the education process than has been the experience in the past, to use other approaches to break the unemployment concentration found in our minority groups and amongst the young and older members of our society.

One explanation for this concentration of unemployment in these groups has always been that, in our increasingly sophisticated society, there is less work for the unskilled to do. The role of the educator may, and indeed, must go beyond the viewpoint that the only cure for unemployment is education for those whose background is limited. Often, education for progressively higher levels of skill resulting in substantial achievement changes is a comparatively slow process. Vocational and technical educators may have to find a more corollary and pragmatic solution to the lack of education alone as a cause of unemployment, by educating the decision-making segments of our society against the concept that given the technology at any particular moment, there is the requirement that the totality of available labor forces must adjust to it. In lieu of this, our educators may determine (through technology information), in much more detailed measure than is now the case, the given characteristics of our labor force as they do indeed exist, and educate business and industry to adjust its technology to these characteristics. In time of crisis, such as a war, the latter philosophy often springs into predominance. An operation is required with a labor force that may not contain sufficiently educated or highly skilled people to mount the kind of technology envisioned by many as optimum. The existing labor force is found to contain different characteristics of skills or abilities and as a result, a variegated technology is needed and comes into being. Whenever there is an urgent and sufficient demand for particular products, industry finds the means to produce these products in a way which utilizes the labor forces available. Conventional usages of Instructional

Technology are often the major methods by which the vocational or training task is accomplished.

- Although education alone is not the sole key to the problem of unemployment, it will contain a majority of the elements necessary to the eventual solution of this problem. Education sharpens the skills, and through these skills, permits technological advancement of the society in direct proportion to the ratio of economic advancement in that society. Then too, education assists people in becoming adaptable to changing conditions. The loss of productivity is considerably less in societies characterized by higher educational attainment than it is in those of lower educational levels.

Augmenting its critical economic role, technology in the organized form of proper deployment of its mass media and resource centers distant from the formalized institution can free education and training from the shackles of its current on campus or in-school chains. It can open opportunities for a vast segment of population presently deprived of real and practical opportunity to upgrade themselves. It can coordinate the employment and educational potentials of government, business and industry.

The concept must be one of direction, not rejection. The value of a total system lies in its regenerative and improvement capacities. The more that enter such a system, the longer it is tried, the greater the data base - the more successful it will be. A realizable utopian dream? Many believe so.